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ABSTRACT

Based on collaborative learning theories, this qualitative study describes seven adult students' experiences of learning in a context of synchronous computer-mediated communication within a distance education environment. The setting was an 8-week, Internet-based undergraduate/graduate sociology course sponsored by Indiana University Purdue University at Fort Wayne. The primary mode of instruction was text-based, synchronous computer conferencing (online discussions). Course requirements included weekly interaction in the chats among small groups of fellow students and the instructor. Data collection focused on a series of four interviews with each study participant and was supplemented by observations of participants' interactions in the synchronous conferences, learning journal entries, and a reflective journal maintained by the researchers. Analysis of the evidence focused on cognitive and affective responses as study participants learned computer competencies, critical thinking skills, and course concepts. As a result of this study, synchronous computer conferencing was validated as a potentially motivational and effective tool for interactive learning with computer-mediated communication in the distance education environment. (Contains 27 references.) (Author/MES)

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# A Case Study Describing Student Experiences of Learning in a Context of Synchronous Computer-mediated Communication in a Distance Education Environment

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***Abstract***

*Based on collaborative learning theories, this qualitative study describes seven adult students' experiences of learning in a context of synchronous computer-mediated communication within a distance education environment. The setting was an eight-week, Internet-based undergraduate/graduate sociology course sponsored by Indiana University Purdue University Fort Wayne. The primary mode of instruction was text-based, synchronous computer conferencing (online discussions). Course requirements included weekly interaction in the chats among small groups of fellow students and the instructor.*

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## Introduction

To remain competitive in the adult student market, colleges and universities are hurriedly implementing Internet-based technologies to deliver courses. According to the Distance Education at Postsecondary Education Institutions report for 1997-1998, 1.6 million students were enrolled in distance education courses in 1998, compared to 753,000 students enrolled in distance education courses in 1994-1995. Eighty-two percent of the two-and four-year institutions surveyed planned to start or increase their use of Internet-based technologies within the next three years (Lewis, Levin, and Greene, 1999).

Application of the adult learning theories of Vygotsky (1978), Rotter (1954), Astin (1985), and Johnson and Johnson (1994) note the need for nteraction in any learning context, including one of computer-mediated communication in a distance learning environment. Cited benefits of teaching and learning with computer mediated communication, including computer conferencing, have included learning that assists students in acquiring critical thinking skills (Bragg, 1999; Eastmond, 1995; Harasim, 1987; Saunders, 1998), the development of collaborative and cooperative learning skills (Berge, 1995; Eastmond, 1995; Harasim, 1989; Hiltz, 1990; Yakimowicz and Murphy, 1995), and increased effectiveness in learning (Bates, 1993; Bragg, 1999; Harasim, 1987). Using the attributes of computer-mediated communication, educators are challenged to design instructional events in ways that shape this new medium into interactive and meaningful learning environments.

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At the same time distance educators must learn how different aspects of technology influence interactivity and collaboration, students are challenged to learn how to learn in these new instructional environments. Researchers report that the majority of adults are satisfied with learning in computer-mediated contexts, but Holt and her colleagues reported that not all students appreciated learning in this format, feeling isolated and frustrated by the lack of visual cues in an Internet-based forum (Holt, Kleiber, Swenson, Rees, and Milton, 1998). A continuing need exists for reflection upon the in-depth meaning of adult students' experiences in a variety of interactive computer-mediated communication contexts. Saunders (1998) recently described students' cognitive and affective responses to learning with *asynchronous* computer-mediated communication as a major component of a multimedia distance learning environment. The course in the Saunders study was delivered via one-way video, two-way audio teleconferencing, and was offered by the Educational Studies Department at Ball State University. Building on Saunders' investigation, the purpose of the present study was to describe and improve the understanding of adult students' experiences of learning in a context of *synchronous* computer-mediated communication in an Internet-based course.

Methodology and Theoretical Framework

The purpose of qualitative descriptive research is to "achieve an understanding of how people make sense out of their lives, . . . and to describe how people interpret what they experience" (Merriam and Simpson, 1995, p. 98). The focus of this study was upon the particular phenomenon of adult students' experiences of learning, and the specific situation was learning through the interactive, synchronous computer-mediated communications of a distance education course, Sociology of Poverty. The complexities of the phenomenon's variables were inseparable from their context. Thus, the research was a case study and based on case study assumptions and methodology (Merriam, 1998).

Qualitative research, from a constructivist viewpoint, assumes that multiple realities exist as a result of personal interactions and perceptions. According to Merriam and Simpson (1995), "beliefs about the nature of reality and about how knowledge is constructed, in addition to the problem you have identified and the questions you seek to answer, determine the selection of your research design" (p. 99). In this case study, the researcher's interest was focused on achieving an understanding of how students made meaning from their experiences in the Internet-based course, and how adult students constructed reality in this learning context. Using an inductive process of building concepts, propositions, and theories (Denzin and Lincoln, 1994), the purpose of the research was to describe and understand students' cognitive and affective responses to their social experiences in the synchronous computer conferences of the Internet-based course.

Within the constructivist perspective, theories concerned with social interactions of the individual were foundational to the present research of students' experiences of learning. Rotter's Social Learning Theory (1954) and Vygotsky's Cultural Theory (1978) were viewed as particularly relevant. Rotter asserted that enriched human behavior (learning), acquired through social interaction with others, requires a meaningful environment. Critical to the present research was the 1978 work of Vygotsky, who argued that it is from stimuli within a social environment that an individual derives and develops cognitive growth. Vygotsky asserted that interaction and collaboration with

fellow students, including a group's shared perspectives and solutions, arrived at through dialogue, debate, negotiation, and compromise, were essential to meaningful learning. In the present study, the synchronous computer conferences provided students the forum for dialogue, debate, negotiate, and compromise.

Collaborative learning theories were also relevant to the present study. For example, the Social Interdependence Theory of Johnson and Johnson (1994) asserted that the way social interdependence is structured is reflected in students' behaviors. If the interdependence is positive, students interact cooperatively, facilitating each other's learning. On the other hand, if the interdependence is negative, students interact competitively, hampering others' learning efforts. Collaborative learning requires active participation of individuals' cooperative efforts to construct knowledge. The weekly synchronous computer conferencing in this distance education setting enabled and supported active and collaborative participation by learners in a meaningful learning environment.

The upper level undergraduate/graduate Internet-based course, Sociology of Poverty, sponsored by Indiana University Purdue University at Fort Wayne, Indiana, was designed to broaden access to higher education through the distance learning environment. The elective course was offered by the Sociology Department during the Summer Session, 1999. The host Web-site for the course, Oncourse, provided students with (1) e-mail access to the course instructor and other students enrolled in the course; (2) access to course syllabi and schedules; and (3) access to course grades. Due to technical difficulties, three additional course sites included:

- Class Notes, posted by the course instructor;
- Reserved Readings; and
- computer space for the required synchronous computer conferencing (see Appendix A).

Unlike many distance courses which require a widely ranging number of face-to-face interactive sessions (classroom-based instruction), no face-to-face interaction was required of these students. Participants were required to interact in 90-minute synchronous computer conferences (online discussions) weekly in small cohort groups of three and four students. These online discussions, moderated by the instructor, were viewed by the instructor as the value-added component of the Internet-based course. In return, students were expected to actively engage in meaningful discussions based on the assigned readings, respond thoughtfully to the instructor's questions, share ideas based on facts, and constructively build on the messages of peers. To provide incentive and acknowledgment of their efforts, the instructor awarded students a maximum ten points for participation in the weekly conferences.

Of twelve students enrolled in the Internet-based course, seven, ranging in ages 31 to 42 years, volunteered to participate in the study. Consistent with descriptive qualitative research, a variety of data collection techniques were employed. Over a ten-week period, a series of three or four interviews with each of the seven study participants was conducted. Participants responded to questions about their thoughts, actions, and feelings in relation to learning via the required, weekly synchronous online discussions used for instruction in this distance setting. Important evidence was also gathered through direct observations of four of the seven study participants as they interacted from homes and offices during their regularly scheduled discussions. The firsthand account of

participants' online interactions, along with interviewing, allowed for a more holistic interpretation of the phenomenon under study than what would have otherwise been possible. Additionally, seventeen learning journal entries were collected from five of the seven study participants highlighting participants' meaningful experiences of learning throughout the course.

Although data were sorted into responses of graduate participants and responses of undergraduate participants, and responses of participants experienced with Internet-based distance education and responses of those inexperienced with Internet-based distance education, differences in the cognitive and affective responses of participants were few. Evidence was continuously analyzed, conclusions were drawn, and recommendations were made.

## Findings

Characteristics of the study participants importantly influenced the outcomes of the present study. Of the seven study participants, two were graduate students and five were undergraduate students, representing majors of education, business management, and general studies. The two graduate participants were experienced computer users, but inexperienced with Internet-based distance education. In contrast, three of the five undergraduate participants had previously taken Internet-based courses, although the technology used in all prior experiences was primarily based on asynchronous computer-mediated communications with the teacher. Of the remaining two undergraduate participants, one had used computers extensively at home and at work, and one had used a computer at home for six months. In other words, computer competencies varied widely. What the present study population of seven had in common was that all were adult students returning for required course work to complete degrees or enhance careers, all had some experience using computers, all had self-selected the Internet-based course, and none were sociology majors.

A critical impact on the study was that six of the seven participants stated that the primary reason for selecting the elective course was, "It [The course] was over the Internet." Not having to convene in the university's classrooms granted these students access. Phrases commonly voiced in interviews included, "I wanted the convenience—I don't have to drive all that way to campus," and "I couldn't do it any other way with my kids." This population of adult students, diverse in their range of computer experience and fields of study, were homogeneous in their openness to using technology to complete degrees and advance careers from homes and offices.

Interviews were conducted at weeks three to five, weeks four to six, week eight, and week ten of the eight-week course. Observations, conducted in the settings where participants interacted in the online discussions—spare bedrooms, living rooms, and workplaces--were conducted at weeks four to seven. Learning journal entries, collected at random when attempts to collect weekly journals failed, were submitted from weeks three through seven. From these sources of evidence, data were categorized into participants' cognitive and affective responses to the required weekly interaction of the synchronous computer conferences.

Cognitive activities associated with the online discussions focused on participants making choices as to the best uses of personal resources, and managing the technology. As in the Saunders (1998) study, "management of personal resources" was subdivided

into the categories of "time management" and "investment of effort." Unlike the Saunders study that examined a context of asynchronous computer-mediated communication, "management of technology" was subdivided into "information management," "process management," and "interaction management." Affective responses were categorized as "management of others," including "interpersonal networking" and "peer support," and "management of self," including the "development of self efficacy" and the "use of self direction."

Participants demonstrated management of personal resources as they continually judged how to best spend their time and effort preparing for and engaging in the online discussions. A central issue discussed by all participants throughout the interviews, but particularly early in the course, was concern over the time required to prepare. All seven of the study participants reported activities that included extensive reading of assigned texts, Reserved Readings, and Class Notes, printing Reserved Readings to read off-line, and selectively printing Class Notes posted by the instructor. One student voiced her thoughts that were inferred by other participants: "This is taking an insane amount of time!" She continued without prompting, "printing off the Reserved Readings, some were 40 pages. That was such a pain! But I was glad I didn't have to come up here [to campus], and it's a good thing I have unlimited Internet access!" The implication of five of the seven participants who lived outside the university's locale was that students preferred spending time printing the Reserved Readings and Class Notes with their home computers to driving the distance to attend a live classroom.

Beyond preparation, time management was the essence of participants' descriptions of their experiences interacting in the online discussions. To process the quantity and fragmentation of incoming messages, and to compose substantive messages within the perceived time limits required assertive time management, particularly by those uncomfortable with their online writing skills. According to one participant, "I went out and bought some of those page markers, you know, so that I could find things in the book faster. I'm a poor typist and concerned about trying to take part in a discussion when you're trying to type." Two of the seven participants expressed a lack of typing and writing (grammar and spelling) skills that seemed to shape their participation in the online discussions. Gathered from observation evidence, time-saving tactics employed included contributing short and succinct messages, messages that were incomplete sentences, and messages void of punctuation and/or capitalization. The learned skills used by these participants to compensate for known deficiences were, in effect, efforts to manage time during the online discussions.

The investment of effort for interacting in the synchronous conferences was an issue of concern expressed by six of the seven study participants. When questioned about her preparations for the upcoming discussion, one insightful participant responded: "I guess I pay a bit more attention to the reading material. I mean, in this format, I have to say something so she knows I'm there." The majority of the participants perceived learning in the online environment a greater challenge than what they had anticipated prior to the course.

The strength of using a qualitative case study approach was clearly established as observation evidence illustrated important differences in the quantity and quality of energy required of study participants with adequate typing skills and study participants lacking online writing skills. Participants who reported lacking online writing skills were

observed to put forth at least as much, or more effort coping with the keyboard as they did acquiring course content. The pressure of the clock was apparent in the body language of those lacking keyboard expertise. Jaw muscles tensed, shoulders rose, and breathing seemed to almost stop when these participants typed their messages. Deep sighs of relief were heard once "send" was clicked. When one of these participants was asked what he was thinking following a contribution near the end of a discussion, he responded, "I'm *always* nervous when I'm typing. I flunked English 101." This participant had a spell-check program open and running as he participated in the online discussions. Another participant described her thoughts during an online discussion: "I think if I write it, it will take two or three minutes, and by that time, the group will have moved on."

In contrast, participants who reported adequate keyboard skills appeared to invest greater effort reflecting on course content than they did concentrating on the keyboard. Again, observation evidence provided key information. Those participants observed who appeared comfortable with the keyboard were seen inputting messages, responding as desired, and having time remaining between postings when they skimmed text materials. One of these participants questioned about her thoughts during an online discussion responded: "I was just absorbed in some of the statistics the instructor was giving us. I really got engrossed in the discussion." The time-dependent, text-based environment of the synchronous computer conferences required that participants invest their efforts in learning to use computers, interacting with peers, and applying course concepts.

A second cognitive strategy used by participants was management of the technology. Using the analogy of Chinese nesting boxes, the largest of the boxes was "management of [computer-based] information." Management of the computer-based information was necessary before the "process" of participating in the online discussions could be mastered. When the process of participating in the online discussions was mastered, the smallest nesting box, "management of interactions," could be entered. Management of interactions was required for participants to gather meaning from the online discussions of the Internet-based course.

Prior experiences assisted participants in their readiness to learn computer-based information. Participants in the present study were, to varying degrees, experienced navigators of the World Wide Web and its resources. However, knowledge and skills that went beyond navigating the World Wide Web were needed to manage the technology. When interviews began at weeks three to five and participants were asked about preparations, four of the seven participants responded that they "logged on early" to ensure punctual attendance in the discussion room. One participant whose group met in the evening commented, "I get online . . . about 30 minutes early because the problem in the evenings is that it's a peak time, and sometimes it's hard to get on." This response was typical for the participants who met during evening hours. Participants adapted quickly to the limitations of their Internet Service Providers.

All seven participants struggled to develop new skills to manage the process of interacting in the online discussions. Participants were challenged to handle the sometimes lengthy delays between postings, track several topics being discussed at once, process multiple incoming messages, and contribute substantive messages in the text-based environment. One participant described a common frustration: "You end up usually having different conversations going on at the same time. Because while you're typing,

people are thinking, 'Oh, I need to say something,' so they start a topic. In the meantime, you've started your topic, so by the time you hit the 'enter' button, there can be three or four ideas that pop up at once."

During these delays, participants were observed playing computer games, managing Windows-based calendars, and reading e-mail to cope with the intermittently slow pace of the discussion. Others watched the ticking clock at the bottom of the computer screen to predict incoming messages. For example, during an observation, one participant intently watched the ticking seconds, exclaiming, "Oh boy, it's been three minutes, everybody's typing away!" Participants were also observed printing excerpts that contained content summaries or procedural instructions from the instructor during this "downtime."

Tracking the multiple conversations required that participants adapt to the characteristic ambiguities of the text-based, computer conferencing environment. In two observations, participants turned to look at the researcher with questioning facial expressions after reading incoming messages. Statements made to the researcher included, "I don't know what that means," and "I want to say something but I don't know what to put here." In two other observations, after reading messages, participants shook their heads back and forth, as if to say, "I don't understand." While one might have expected participants to reread prior messages or ask questions for clarification, such behaviors were not observed. Anticipating the arrival of new messages, participants quickly moved on.

Besides handling the time delays and tracking multiple conversations, process management required managing the text-based environment. Regardless of prior experiences with Internet-based distance education, the process presented challenges. In the present study, the undergraduate participants, in particular, were challenged by the keyboard, reading, and writing skills required to keep up with the synchronous, text-based conversation. Participants weighed the investment of their efforts against the time it would take to type the message. As one participant who demonstrated exemplary keyboard and online writing skills described, "It's a lot of work. At least, that's the way it feels. I think it's that you have to type everything. It just feels like so much more work than going to a regular class."

One particularly insightful participant described his frustration with the text-based environment comparing the computer environment to that of a classroom: "You don't have some of the other cues. You know, you don't have somebody roll his eyes. You have to judge him or her entirely from what they 'say' and how they 'say' it." Another especially articulate participant observed:

> The only non-verbal cue you have is if something comes back really fast. Then you might expect that they're a little into it . . . sometimes it seems like everybody is just sitting back, and you don't know if that's because they took a moment to get a Coke, or what . . ..

On the other hand, some participants cited advantages of interacting in a text-based environment. One participant's response was typical: "Oh, it's fun. I like it because I can type my statement in . . . and I can revise it. I can wait to see what other people will say. And I can *not* send it." Although time for reflection was brief in the synchronous discussions, participants came to realize that they reflected on their words in this context.

Holt et al. (1998) reported that data have suggested participant reflection may be greater in a Web conference because of the ability to reread an entire sequence of postings while composing a response. The text-based environment offered participants a form of control unlike prior experiences in face-to-face instructional settings.

Part of managing the technology included managing interactions. Participants were observed managing interactions with the print and text-based course materials (content), fellow group members, and the instructor during the synchronous computer conferences (Moore, 1989). Unfortunately, the conferencing software used for the course lacked the capability to "save" more than the concluding remarks of online transcripts. Therefore, during the online discussions, participants were occasionally observed printing (on-screen) excerpts. One participant "saved" transcripts page-by-page for later printing and review. At eight weeks, when one participant was asked what had helped her learn in the online discussions, she responded, "I guess the interaction between others and the resource materials. I didn't just use them [resource materials] as a book--plop! I had them there and I was avidly flipping through pages the whole time." Observation evidence demonstrated that this interaction with resource materials during the synchronous conferences was more common among the graduate students when compared to that of the undergraduate students.

As participants interacted in the online discussions, messages were posted sharing personal experiences and perspectives, applying course concepts in meaningful ways, building on each other's knowledge, and supporting, as well as challenging peers' and the instructor's views. Observations illustrated evidence of interaction management as participants asked questions of peers as sources of information. For example, one participant posted: "How is it that government workers do not pay into Social Security, but yet they reap the benefits?" A fellow group member, from his law background, promptly replied: "There are a number of government employees and others who do not pay social security taxes, but they cannot draw from social security without paying in to the program. The inequity comes from the fact that they normally can retire early and get another job . . .." In this manner, students built upon others' knowledge in the weekly discussions.

At eight weeks, when participants were asked what helped them learn in the online discussions, three of the seven participants reported that they were encouraged by the interpersonal interactions. A typical comment was: "I always liked the feedback from the students, positive or negative. Every once in a while, someone would say, . . . 'I never thought of that.' So you'd think, 'oh, cool.'" When asked about the most important learning experiences provided by others in online discussions, the majority of the participants cited experiences in which they learned new information by reading different perspectives of group members' with diverse backgrounds. For example, one participant described a peer's contribution based on the Amish culture. She elaborated, "it kind of made me think about their [Amish] lifestyle. You never hear about Amish on welfare, for instance. I thought more about it later . . . I don't consider myself a deep thinker, and I thought, 'wow, I thought about this on my own.'"

Participants also managed their interactions with the instructor. Evidence demonstrated that participants responded to questions posed by the instructor, challenged course concepts, and asked procedural and clarification questions of the instructor. As the instructor asked questions, group members posted their responses. Unlike the context of

classroom-based instruction, in this synchronous conferencing environment, each group member had the opportunity to respond. In turn, the instructor was provided with important feedback related to how well students were prepared and their levels of comprehension of the assigned readings.

At weeks four to six, three of the seven study participants expressed conflict with the instructor's and text authors' political views on poverty. All three reported publicly expressing their viewpoints that conflicted with the instructor's online perspective. For example, one participant reported that he "continually talked about individual accountability [as the instructor talked about society's responsibility]." Without prompting, he elaborated: "There's not even a discussion, or really much *tolerance* of a discussion of individuals having an individual responsibility for being poor." In response to the instructor's calculation of a necessary annual income of $20,343 for a single mother and child, another participant was observed posting, "I would agree that anything below that would be tight, but hardly impossible. My husband and I . . .." When questioned later, this participant reflected, "I don't think you would find too many people in a classroom who would stand up and say the teacher's wrong. Most people are afraid to do that. They do here . . . but they're tactful about it." Another participant was observed typing a message of disagreement with the instructor's viewpoint, but deleting the message prior to posting. When questioned following the discussion, she responded, "I don't want to tick her off. She's grading my papers, you know?"

Participants developed and implemented interaction strategies that characterized the online discussions. Through effective management, participants were empowered by their online participation. Despite frustration over the lack of visual and aural cues and conflicts over political views, participants were generally positive about interacting in the context of the synchronous computer-mediated communication. Typical comments included: "The interaction was good," "discussions were a good way to get feedback," and "I actually felt like I'd gotten to know some of the others." As the course progressed, participants appeared to move from viewing the instructor as the authority and single source of knowledge to viewing each other as collaborators and valuable resources for learning new information.

Cognitive responses to participating in the weekly synchronous conferences included management of personal resources, including time and effort, and management of the technology, including management of computer-based information, the process of participation, and online interactions. Although all seven of the participants succeeded, participants' experiences were somewhat dependent on keyboard and online writing skills, and personal political views.

Similar to Saunders' (1998) study of asynchronous computer-mediated communication, affective responses to learning with synchronous computer-mediated communications included managing others and managing self. The affective strategy, management of others, included the categories of interpersonal networking and providing peer support.

At week eight of the eight-week course, participants viewed fellow group members as valuable sources of information and different perspectives. Participants reported receiving "new information," "relevant information," and "thought-provoking" information as the most important learning experiences in the online discussions. At week ten, participants reported that they had gotten to know their fellow group members.

For instance, when asked how one participant felt logging on for the final discussion, she responded, "I really liked the discussions, so I thought, this is kind of sad. I felt we'd kind of bonded because we had done everything together. It's kind of a mystery the way I feel like we know each other."

Despite the combination of the short time span of eight weeks and the distance learning environment, evidence demonstrated that participants developed relationships, providing support and encouragement to peers from week three through course completion. For example, at week four, when one participant was asked how he felt preparing for the week's online discussion, he responded: "Nervous. But last week when I got into the discussion room, it was nice to see who was in the room, and everyone greeted each other and so right from the beginning it was sort of a relief."

The affective strategy, management of self, included the categories of managing both self efficacy and self direction. At weeks three to five, participants expressed apprehensions about participating in the present week's discussion. A typical comment was: "I just knew if she called on you—you would be on the spot—so I went back over the notes." Another participant stated, "I'm nervous about the technology. I know enough to know that things don't always work as expected." "Being graded" was reported as a contributing factor to several participants' anxieties. While awarding points produced anxiety, the challenge was manageable for the participant with the lowest level of computer skills. Those participants who lacked computer experience, experienced enough success to be encouraged and enough challenge to prod them toward improved skills.

By weeks four to six, participants' anxieties reportedly eased as participants experienced success submitting an electronic survey, and successfully participating in an online discussion at week three. To encourage group interaction in the synchronous conferences, the instructor, as moderator, worked to create a relaxed, informal learning climate by posting messages that read more like conversation than formal writing. For example, one concluding message read, "yep, we are out of time. This book is again a structural analysis of the issue of povrety [sic]? Right? any questions?" Although unsupported personal opinions and beliefs were not permitted, spelling and grammatical errors were acceptable. When asked about technical problems at weeks four to six, typical comments included: "I know how to get around what's not working," and "the discussion was nothing to get in to or out of." One participant who had expressed concern about her keyboard skills, proudly stated, "I got as much across as anybody else." As the course progressed, all seven of the participants developed and used self efficacy to thoughtfully interact in the online discussions.

The affective management strategy of using self direction was commonly observed. Most of the study participants reported diligently preparing for the discussions—reporting reading the course texts and Class Notes, highlighting important points in the texts, mentally determining key themes of the texts, bookmarking text selections, and making lists of questions. One participant stated, "I'm taking four classes this summer, working over 40 hours per week, and I have three kids. I read what I can before the discussions." Guided by the direction of the instructor and participants' personal time constraints, these adult students set their own goals and standards for preparation.

As well as spending considerable time reading assigned materials, participants spent considerable time learning to use their computers. At weeks three to five, without

prompting, four of the seven participants expressed that the computer aspect of the course was "like taking a second course." "You're always running into these walls [technical problems]," stated one participant. At week six, a participant's journal read, "I'm trying to install Netscape on my laptop by using Internet Explorer to go to the Netscape site--I want to participate in the discussion while I'm on vacation--then download it; it doesn't work. Very frustrating." At week eight, when the same participant was questioned about his progress, he proudly reported, "I figured it out. My last problem was sometimes I'd hit the 'update' button and nothing happened. But if I typed a period, [it worked]." Participants clearly illustrated tackling problems for the purpose of gaining knowledge and understanding through the use of self direction.

As stated earlier, three of the seven participants expressed disagreement with the political perspectives of the texts' authors and the instructor. Each of the participants expressed frustration at not being "heard" by the instructor. Interestingly, reactions differed. One participant was stimulated to take charge of her own learning outside of the online discussions using Internet resources. She described her reaction: "I found myself getting into 'Congressional Quarterly' so that I could draw my own conclusions." In contrast, the second participant who disagreed with the course content reported managing the disagreement by "playing the game." When asked to elaborate, he responded, "I told her what I thought she wanted to hear, from the book, whether I believed it or not." When the third participant was asked what he did that helped him learn, he replied: "Nothing really. I suppose that I have not been as motivated as a learner as I might otherwise have been. I knew the instructor was liberal, but this was just *too* far away. I don't feel I learned much." The different reactions of these highly self directed participants, one who extended her learning, one who "played the game," and another whose motivation to learn withered, illustrated the complexities of the affective domain in learning with computer-mediated communications.

## Discussion

The undergraduate and graduate participants experienced a number of cognitive and affective responses to learning primarily in a context of synchronous computer-mediated communications in an Internet-based course. Cognitive responses included management of personal resources and management of technology. Affective responses included management of others and management of self.

Several common themes were embedded in participants' cognitive and affective responses to learning in a context of synchronous computer-mediated communication in a distance education environment. Positive themes that participants frequently alluded to were the sense of empowerment, and the discovery of new meanings within the context of the online discussions. Other important themes were the frustrations of the text-based environment, primarily the lack of visual and aural cues, and the moderation style used by the course instructor in the online discussions. These four themes were deemed worthy of further consideration, and thus, serve as the framework for the following discussion.

The theoretical foundation of the present study was based on social learning theories. These theories contend that interaction and collaboration with peers and the teacher is a requirement for meaningful learning. Thus, the instructional goal of the course design was to provide opportunities for interaction between the instructor and students, and among small groups of three and four students each. The instructor, as

course designer, judged meaningful group discussion crucial to students' understanding of current poverty and social welfare issues. Therefore, the purpose of the required, weekly online discussions was to stimulate student interaction, as well as critical and reflective thinking in the distance learning setting.

In the present study, the sense of empowerment that was enabled by the synchronous computer-mediated communication, including the feeling of belonging to a group, was a common theme. By employing the cognitive and affective strategies for learning as described in the findings, participants felt empowered as they discovered they learned by contributing to the synchronous computer conferences. Reflection time, albeit short in the time-restricted synchronous environment, and the availability of immediate feedback contributed to participants' sense of control over interactions in the online discussions. Similarly, Saunders (1998) found that participants interacting in the asynchronous, online environment of the "Class Page" reported feeling empowered by increased responsibility and control. Burge (1994), in her study of learners' perceptions of asynchronous computer conferencing, reported that students were empowered by the emotionally supportive contact and the different perspectives offered by peers in the computer-mediated climate. This study supported their findings.

While researchers have been enthralled with the benefits of asynchronous computer conferencing, little attention has been given to educational applications of computer conferencing in the synchronous mode. Davie and Wells (1991) were among the first recognized authorities to advocate incorporating computer conferencing into distance education courses to empower learners. Online education, Davie and Wells argued, especially facilitates the development of student empowerment because its text-based nature promotes student creation of more well-considered positions, thereby supporting and reinforcing students' personal power. Additionally, the greater mediation and attention instructors must provide to students participating in online classes places instructors in a "stronger position to support [students'] empowerment as creative autonomous learners" (p. 17). In their view, computer conferencing, particularly "synchronous exercises" (p. 19), which require student initiative, student discussion, and student reflection, could provide for the desired higher order cognitive skills in distance education. Davie and Wells stated: "A synchronous exercise enables immediacy of challenges and support, as well as reciprocity of experience" (p. 19). In the present study, the synchronous online discussions required self direction for learning to occur, and provided participants opportunities for analysis, and active exploration of thoughts and ideas.

Related to student empowerment was another theme enabled by the synchronous computer conferences--participants' sense of belonging to a group. Davie and Wells (1991), in their report on the Capstone exercise in which students presented projects to a commanding officer in the online environment, judged that the crucial psychological feeling of belonging to a group could be fostered through a carefully designed synchronous computer-mediated activity. The present study supported their judgment. The synchronous computer conferences were reported by one participant as "the only way to develop the psychological feeling of belonging to the class." If feelings and emotions are part of learning, and pleasurable interactions among students facilitate learning (Holmberg, 1989), then synchronous computer conferencing holds the potential to be an effective educational tool, capable of student empowerment.

Participants experienced the discovery of new meanings in the computer-mediated environment of the synchronous conferences. The social context was designed by the instructor to support the use of resources of social groups to expand and enhance learning. Students were divided into three small groups of three and four students per group for the online discussion activity. This aspect of the course design created the potential for greater student-teacher interaction and greater student-student interaction. In response, participants constructed shared meanings through their interactions. The Cultural Theory of Vygotsky (1978) asserted that an individual develops cognitively through dialogue in a social environment. The interactivity and collaboration with fellow group members and the instructor in the online discussions provided this social environment. In online discussions at weeks four to six, study participants were observed actively engaged in course content as they exchanged messages of humor, personal perspectives, past experiences, new information, and the reconstruction of their political perspectives. Rather than absorbing the transmitted knowledge, participants were observed actively creating new meanings within their contexts of prior knowledge about people living in poverty. Newman (1989) postulated that when people with different goals, roles, and resources interact, the differences in interpretation provide opportunities for the building of new knowledge. Participants' cognitive and affective experiences of learning enabled the construction of new meanings in the context of the synchronous conferences.

The limitations of the text-based environment, void of visual and aural cues, presented participants with continual challenge. As stated previously, there was no face-to-face interaction required for the course. While the text-based environment was most frustrating for students attempting to complete their independent group assignments in the asynchronous e-mail environment (see Sorg, 2000), frustrations were also plentiful in the synchronous mode of computer-mediated communication. In the synchronous component of the course, participants were disappointed that the computer software used for the course lacked the capability to store discussion transcripts. The lack of visual and aural context cues, combined with the low-end technology incapable of saving discussion transcripts contributed to the frustrations of participants.

In response to being unable to "go back" to discussion transcripts, participants selectively printed procedural messages and the instructor's discussion summaries on-screen. One of the seven study participants was observed "saving" each page of messages to print and reread at a later date. Because this participant spent a disproportionate amount of time composing his contributions to the online discussions, paper copies of discussion transcripts allowed him the time he needed to read the conversation.

Burge (1994), in her study of 21 graduate students learning with asynchronous computer conferencing, reported that students produced a paper transcript as a strategy to cope with the fragmented nature of the online class discussion. Davie and Wells (1991), writing about student empowerment in computer-mediated communication, judged that the permanent record of conferencing transcripts was critical to maximizing the potential of computer-mediated communication to enhance student empowerment. Davie and Wells credited the saved transcript as a way to encourage student accountability, create an awareness that words are extensions of one's self, and promote self reflection. At the time of the present study, the technical assistant for the course was working toward this end for future Internet-based courses.

An emotionally-charged theme throughout the data collection process was the course instructor's moderation of the synchronous computer conferences. As stated previously, the synchronous computer conferences were judged by the instructor as the value-added component of this distance learning experience. The obvious strength of the synchronous computer conference was found in its ability to support all three of Moore's (1989) interaction types: Content-learner, teacher-learner, and learner-learner. Observation evidence clearly demonstrated that participants shared ideas and newly found perpsectives with the teacher and fellow group members as they interacted with multiple instructional materials.

Eastmond (1992) noted that the educator who takes on the role of conference moderator must "wisely" design computer-based discussions and moderate them effectively to maximize learning. Berge (1995) judged that the density of course content should be inversely related to the amount of synchronicity within the learning setting, and that synchronous communication was particularly helpful in promoting social interaction.

In the present context, the moderator was observed fulfilling numerous roles that demonstrated the instructor's high level of skills and knowledge of the process. While providing enthusiasm for the course content and creating a climate of trust and cooperation, the instructor was observed functioning as lecturer, leader, pace-setter, provocateur, explainer, helper, mentor, manager, and facilitator of learning. The dialogue through which the instructor summarized students' contributions, encouraged participation by reluctant students, waited by silently, provided recognition for insightful contributions, and addressed students by name, encouraged student participation in the computer conferences. As a result, the majority of the study participants practiced critical thinking, improved computer competencies, and applied course concepts.

The subject area upon which the course was based, poverty and social welfare, was inherently, a potentially volatile one. Some participants expressed appreciation for how the instructor lead the online discussions and created a supportive climate. However, as many participants, particularly those most self directed and self efficacious, reported anger and disappointment that their political voices went unheard. From their dissatisfying attempts, participants perceived personal views that disagreed with the political perspectives of the texts' authors and the instructor's were inappropriate to express in the online discussions. In response, destructive learning behaviors were noted. Some participants were observed avoiding contributing messages, deleting messages prior to posting, and posting what the participant perceived the instructor wanted to see in return. Of course, these same behaviors could be observed in a classroom-based setting, but without the familiar visual and aural cues that classroom instructors intuitively rely upon, the potential for misinterpretation in the online environment is great.

The question arises: What is the appropriate balance between teacher- and learner-centered control in synchronous computer-mediated discussions? Does it depend upon students' learning styles, or course content? Answers are beyond the scope of this study, but what is known is that moderating a computer conference, asynchronous or synchronous, requires numerous skills (see Feenberg, 1989) to manage the content, process, and communications.

Four themes were embedded in study participants' cognitive and affective experiences of learning in the synchronous computer conferences of the Internet-based course, Sociology of Poverty: Participants' sense of empowerment, the discovery of new

meanings within the context of the online discussions, frustrations of the text-based environment, and the moderation style of the course instructor. The distance learning context of the present study was Internet-based. The online course was designed to broaden access and provide opportunities for interactivity between the instructor and students, and among students. The educational environment of the computer-mediated communications employed in this instructional setting mediated participants' cognitive and affective experiences of learning.

## Implications for Practice and Research

The focus for researching educational applications of computer-mediated communications is primarily to improve the design of instructional events in ways that will encourage the higher-order thinking skills necessary to prepare adult students in a changing world. The intent of the present research was to deepen the understanding of the Internet-based learning and teaching environment, and provide dependable and foundational information on which to construct further studies of computer-mediated communication contexts in distance education settings, and the future development of distance education course offerings. Briefly, the present research emphasizes three implications for practice and research:

- The role of moderator in synchronous computer conferences;
- the challenges of the text-based environment; and
- the influence of learner characteristics.

The struggle in striking a balance between learner and teacher-centered control of computer-mediated communications was highlighted by the present study. Conference moderation is an important area for further research. The moderation of online discussions, asynchronous and synchronous, has been highly recommended for creating a climate of trust and cooperation, stimulating social interaction among students, and focusing a discussion on course-related concepts. Mason (as cited in Berge, 1995) categorized moderation into three roles, including intellectual, social, and organizational. Berge (1995) added to that list a social role and a technical role. According to recognized authorities (Eastmond, 1995; Feenberg, 1989; Harasim, 1986; Mason and Kaye, 1990), moderating discussions in the context of computer conferencing requires a shift of control from teacher-centered to student-centered learning. Holt et al. stated, "a moderator . . . is most effective when speaking in the voice of a neutral, third-party persona, and not in the personal voice of the individual" (p. 47), thereby keeping interaction centered on issues rather than personalities. Feenberg pointed out the moderator duty of "meta-conferencing," or providing reflection and discussion of the process. Clearly, moderating the social dynamics of the online learning requires many responsibilities of the distance educator. Feenberg (1986) defines the challenge for online educators: "The success or failure of conferencing depends more often than not on the availability of someone willing to accept responsibility for accepting these [moderating] functions, and being able to do so skillfully and consistently" (p. 6).

The text-based nature of the online environment has been described as both a benefit and a stressor to student learning. Feenberg (1989) described the text of online communication as impersonal, limiting, and sterile. While it has been reported that previous computer experience and typing ability made no significant difference in

outcomes for online courses, the present study demonstrated that these factors profoundly affected attitudes, motivation, and self-discipline to participate in the online discussions. In turn, attitudes, motivation, and self-discipline to participate appeared to affect student learning. Presently, participating in computer conferences presupposes a level of knowledge and skill with computer-based processes, including word processing, and fluent reading and writing skills. When these skills are missing, learning requirements demand complete immersion in the process. Educators must carefully and cautiously attend to individual student needs in designing the computer-mediated communications of an online course.

Learner characteristics substantially determined participants' experiences of learning in the online environment. Further research is needed to examine the influence of learning styles upon the student's educational experiences with computer-mediated communication. Generally, studies have suggested that computer-mediated distance education is effective for well-motivated students, particularly those who are unable or unwilling to attend a university, those in rural locations, those already familiar with computers, and those who prefer to work alone or without restrictions on time and location (Schrum, 1998). Research has centered on the personality characteristics, achievements, and communication anxieties of distance students. Few studies have described the affective responses of distance students. No single sresearch investigation was found that compared responses and characteristics of students learning with different computer-mediated communication technologies. Further understanding of the personal factors that influence distance learners in computer-mediated communication contexts will help educators use these technologies more effectively.

## Conclusion

Data collected from students taking courses in the online environment have provided new insights into the needs and goals of educators who teach and design such courses in the distance education environment. Interaction in computer-mediated courses is essential for learning. In the present study, opportunities for interaction were provided by the synchronous computer conferences scheduled weekly.

Students' cognitive and affective experiences of learning in the synchronous computer conferencing environment included management of personal resources and the technology, and management of self and others. Common threads identified from the data included participants' sense of empowerment, the discovery of new meanings within the context of the online discussions, the frustrations of the text-based environment, and the moderation style used by the course instructor in the online discussions.

Recommendations for improving practice included the suggestion that within the context of computer-mediated communications, learners have the opportunity to reflect upon and discuss the process, including a time and place to voice their perspectives. The challenges and benefits of the text-based environment were discussed, as was the influence of learner characteristics. Suggestions for future research included the need to examine different styles of moderation for different purposes and computer-mediated communication components, and the continuing need for further research about learning styles and characteristics within computer-mediated educational contexts.

The inclusion of interactive learning opportunities in online environments of distance education is critical, but challenging for teachers in those environments. Effective instructional use of online discussions places new responsibilities on instructors for skillful facilitation. Without the familiar visual and aural clues, distance educators can easily overlook potential areas for a student's confusion, misunderstanding, or dissatisfaction with course content. There are exhilarating new possibilities for Internet-based education, but the new paradigms are not without problems. Distance educators need to understand and share their knowledge of these fast-changing technologies as the Internet evolves and technological innovations create new demands and opportunities for interactive learning in the distance education environment.

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